

# Population Geography

## 3 CHAPTER

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- Human Population: A Global Perspective
- Population Parameters and Processes
- Human Migration
- Population Structure and Composition
- Population Sustainability

### KEY TERMS

Age-sex distribution	Infant mortality rate
Arithmetic density	Internal migration
Baby boom	Intervening obstacles
Baby bust	Involuntary migration
Carrying capacity	Life expectancy
Census tract	Thomas Malthus
Chain migration	Maternal mortality rate
Child mortality rate	Migration
Cohort	Natural increase rate
Cotton Belt	Neo-Malthusian
Crude birth rate	Overpopulation
Crude death rate	Physiologic density
Demographic accounting equation	Population density
Demographic transition model	Population geography
Demography	Population pyramid
Dependency ratio	Pull factor
Doubling time	Push factor
Emigration	Refugees
Exponential growth	Rust Belt
Forced migration	Sun Belt
Generation X	Total fertility rate
Geodemography	Voluntary migration
Immigration	Zero population growth

## HUMAN POPULATION: A GLOBAL PERSPECTIVE

**S**ometime in October of 1999 the world's population reached 6 billion people. It is hard to comprehend a number like 6 billion, but even dizzying numbers do little to illustrate the immensity and diversity of the human endeavor here on earth. Perhaps even more astounding than the sheer number of people alive today is the rate at which human population has increased during the past 200 years. According to the United Nations Population Division, it wasn't until 1804 that world population reached 1 billion. It took just 123 years for that population to double, reaching 2 billion by 1927. Forty-seven years later, in 1974, the population had once again doubled, and by 2000, 6 billion people inhabited the earth. Projections indicate that the world population will reach 7 billion by 2013.

Staggering human population growth is one of the defining characteristics of our present era in world history; it is also one of the most important issues in all of human geography. To explain this amazing and rapid growth, and to begin to understand its implications, we must ask difficult questions about politics, culture, economics, and history. Why is the population growing so quickly? Which areas are growing fastest? What effects has this growth had on social and ecological systems? And what can we expect in terms of future growth? These questions all lie at the heart of **population geography**, which is sometimes referred to as **geodemography**.

On a global scale, human population shows several distinct geographic characteristics. First, approximately 80% of the world's population lives in the less-developed countries, which includes all of Africa, Asia (excluding Japan), Latin America, and the island nations of the Caribbean and Pacific. Two countries, China and India, each have over a billion people and together hold one-third of the world's current population. Less-developed countries also contain the fastest growing populations. Of the approximately 80 million people that were being added to the world's population each year during the 1990s, 95% lived in the less-developed world. People are also living longer. During the past 50 years, the global average life expectancy has increased by 20 years, from 45 to 65. In the less-developed countries, where most people reside, the basic equation is relatively simple—more babies are being born and people are living longer.

When people read news reports about growth rates in the less-developed countries, they often see figures like 3% and think, "Hey, that's not too much." However, if you look a little more closely at the math, you will quickly realize that even growth rates that seem low can cause rapid population increases over time. Like interest in a bank, population growth is *compounded*. In other words, if a population grows by 3% both this year and next year, then next year's 3% will actually include more people than this year's. This is because next year's growth will be 3% of a population that is bigger than it was just a year ago. For example, if you live in a country with a population of 1 million people, after one year, the population will grow by 3% for a total of 1,030,000. You've added 30,000 more people to your country in one year. The next year, when you apply a 3% growth rate to your current population of 1,030,000, you get a new total of 1,060,900. In year two, 3% ended by including 900 more people than in year one! You can now see how, at a 3% rate of increase, it would not take long for your country to grow dramatically. In fact, one of the most

surprising implications of this concept is that, at a 3% growth rate, the time it will take for a population to double, known simply as **doubling time**, is less than 25 years! Growth rates currently exceed 3% in parts of sub-Saharan and tropical Africa, the Middle East, and Central America.

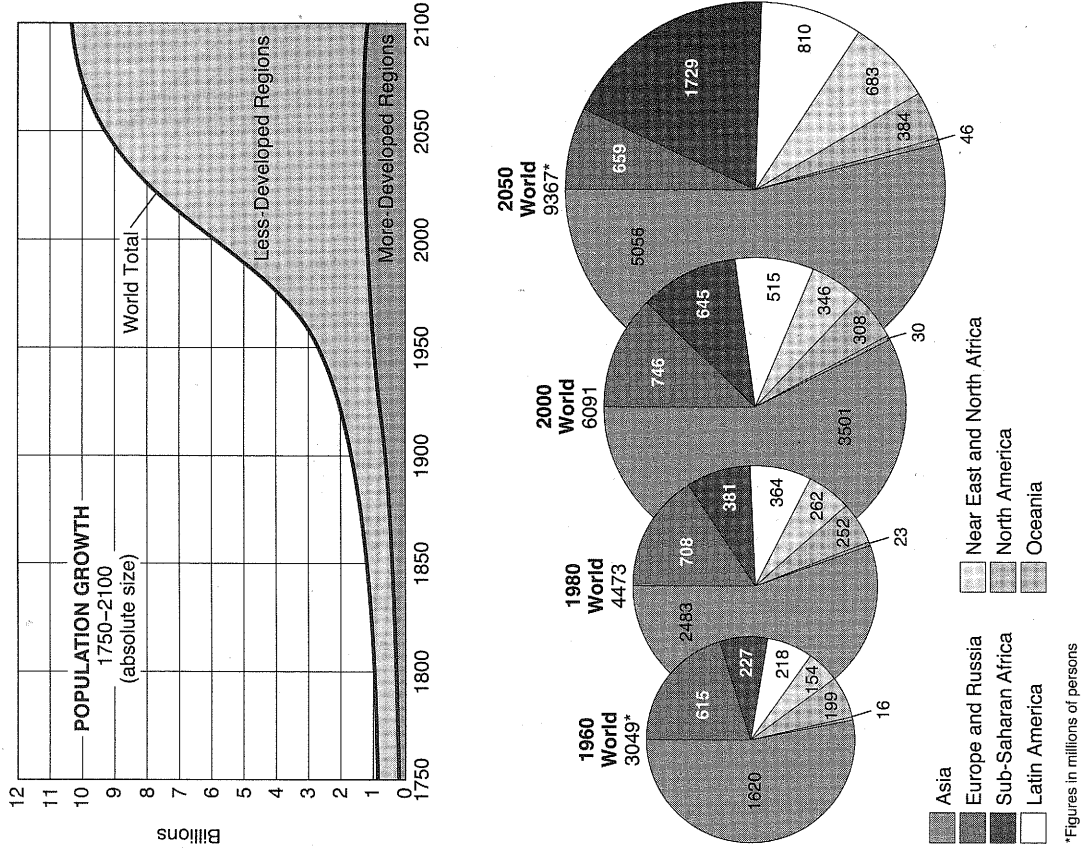


Figure 3.1. The world population began growing exponentially during the late 20th century, with particularly high rates of growth in the world's less-developed countries. Global population will probably plateau around 2010.

The study of human populations, or **demography**, is not static because the world's population will not keep growing forever. Most **demographers**, or people who study population, agree that growth is already showing signs of slowing down. Many current models based on demographic data predict that the world's population will plateau at around 12 billion people some time in the 21st century. Some of the most recent predictions have population leveling off even lower, at about 9 billion people by the end of this century. In the future, as now, most of the people on earth will be living in Africa or Asia.

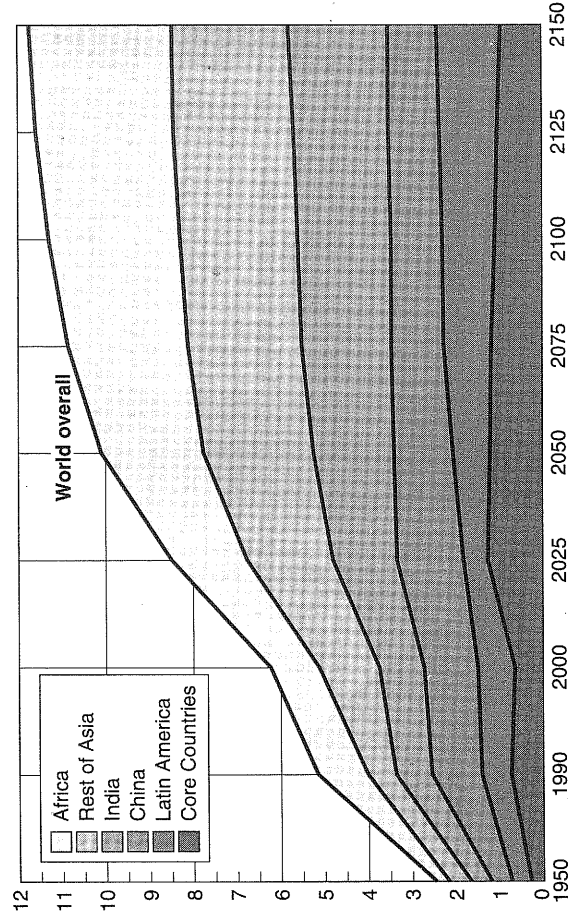


Figure 3.2. World population growth since 1950 by region.

While the overall pattern of population growth throughout human history shows steady and even rapid increase, certain events and environmental limitations have also served to check population growth at different periods in history. With increasing technology, the human species has enabled itself to adapt to many of these constraints, explaining why the number of people on earth is continually growing. The innovations that occurred as a result of the domestication of plants and animals and the Industrial Revolution had dramatic impacts on the number of people the earth could sustain. However, in the 1300s, the Black Plague wiped out between 30 and 40% of the entire European continent. The Irish potato famine in 1845 eliminated half of the country's population in just 50 years as millions of people died of starvation or left the country. Natural disasters such as earthquakes, floods, and hurricanes regularly reduce at-risk populations. Of all the forces acting to check world population, none has been more effective than epidemic disease. When European explorers

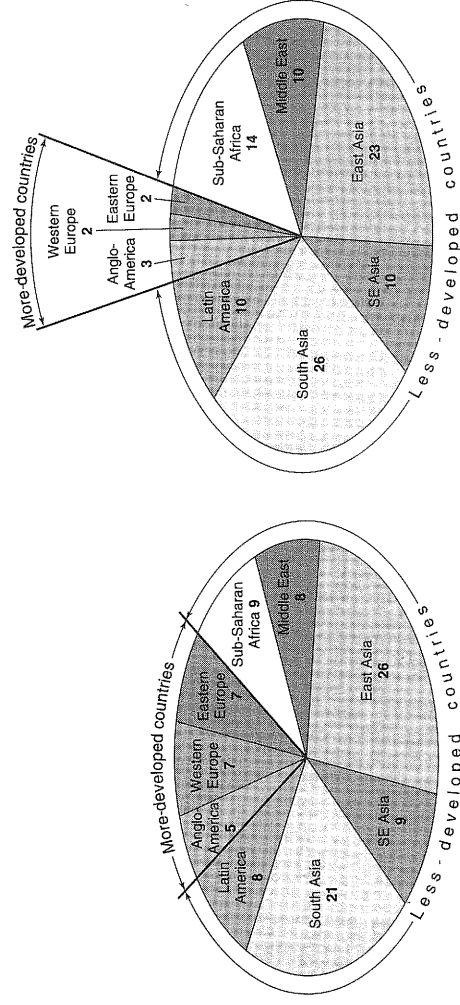


Figure 3.3. Population distribution by world region.

Annual Percentage Increase	Doubling Time (years)
0.5	140
1.0	70
2.0	35
3.0	24
4.0	17
5.0	14
10.0	7

Figure 3.4. Doubling time as a function of a population's annual percentage increase.

and settlers arrived in the Americas and the Pacific Islands, they introduced devastating diseases, such as smallpox, that formerly had only been known in the Old World. Indeed, disease—not war—was the main factor that led to the toppling of native cultures throughout the New World. Today, in many African countries, AIDS is contributing to an escalating death rate and constraining population growth within those nations. In 1999 in sub-Saharan Africa, 23.20 million people were living with the AIDS virus, and over 4 million were becoming infected each year. While this part of the world is one of the areas mentioned as experiencing rapid growth, in the future we may see its growth severely limited by the devastating effects of this virus.

## POPULATION PARAMETERS AND PROCESSES

All the population processes that have been discussed so far can be broken down into a set of parameters, each of which holds vital information about the history and future of a given population. One such statistic is the **total fertility rate (TFR)**, which is a measure of the average number of children born to a woman over her entire life. Fertility rates vary both over time and between places in response to a number of factors that affect women's lives. In some countries with poor healthcare systems, the total fertility rate may be very high, but it might also be offset by an equally high **infant, child, and maternal mortality rates**. Infant mortality rate, which refers to the percentage of children who die before their first birthday, may be a significant factor limiting population growth. Sadly, the infant mortality rate exceeds 10% in some less-developed countries. Infant, child, and maternal mortality rates can have a significant effect on **life expectancy**—the average length of someone's life. Life expectancy varies dramatically from place to place and even within populations. In 1996, African-American males in the United States had a life expectancy of about 66 years, while Anglo-American males, on average, lived to be almost 74. Violence, infant mortality, poor healthcare, epidemic disease, and risk factors such as smoking all contribute to life expectancy.

Each of the parameters described here can be encapsulated within two aggregate variables, the **crude birth rate (CBR)** and **crude death rate (CDR)**, which are statistical terms that refer to the number of live births and deaths, respectively, per thousand people. The difference between the CBR and CDR is called the **natural increase rate (NIR)**. This term is a bit misleading because there is nothing really “natural” about natural increase and because natural “increase” can be either positive

or negative. A negative increase rate indicates that the number of babies being born is not high enough to make up for deaths and, as a result, the population is declining. It is also important to recognize that the NIR is an internal measure that does not account for migration into or out of a country.

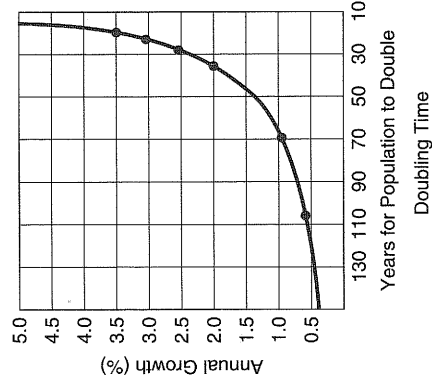
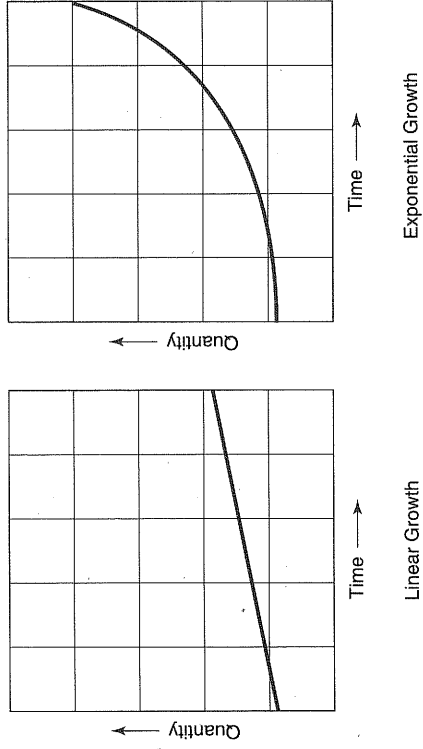


Figure 3.5. When a population is growing exponentially, the rate of growth increases over time, whereas linear growth connotes a steady rate.

Year	Estimated Population	Doubling Time (years)
1	250 million	
1650	500 million	1650
1804	1 billion	154
1927	2 billion	123
1974	4 billion	47
World population may reach		
2021	8 billion	47 <sup>a</sup>

<sup>a</sup>The leveling of doubling time reflects assumptions of decreasing and stabilizing fertility rates. No current projections contemplate a further doubling to 16 billion people.  
Source: United Nations.

Figure 3.6. The earth's human population is currently growing exponentially. However, there are already signs that the global growth rate is slowing down, which confirms the predictions of many demographers.

A few countries are currently showing negative rates of natural increase. In the more developed regions of the world, which include North America, Japan, Europe, and Australia/New Zealand, the natural increase rate has decreased markedly, in some cases actually leading to a stable or even declining population. This is particularly evident in some European countries with aging populations, where death rates now outpace birth rates. As a result, much of the growth occurring in the more-developed world is associated with immigration from less-developed countries. In the United States, natural rates of increase are low; however, immigration and high fertility rates among some groups of newer immigrants are causing the overall population to continue growing. It is also interesting to note that, in the many developing countries, such as Mexico, Brazil, and Indonesia, rates of natural increase are actually beginning to decline. Although the populations of these countries are still growing, they are no longer growing as fast as they once were.

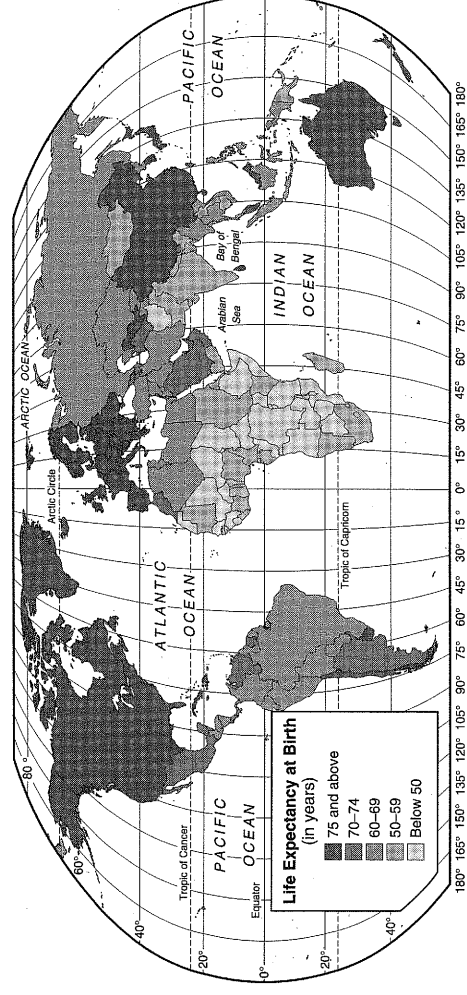


Figure 3.7. Life expectancy by country.

What determines a population's natural increase rate? Several factors have been identified as affecting this rate, most of which are related to economic development, culture, or public policy. The following factors are considered important in determining a population's rate of natural increase.

- *Economic development* has profound implications on the quality of available healthcare, employment opportunities, nutrition, and many other factors that affect population growth. Generally, increases in economic development lead to decreases in fertility and growth rate.
- *Education* affects every aspect of population growth, from fertility rates to prenatal care to the use of contraception. Populations with better education tend to have lower fertility rates and lower rates of natural increase.
- *Gender empowerment* refers to the relative status and opportunities available to women in a given population. When women have more economic and political access, power, and education, fertility rates inevitably drop.



- *Healthcare* can have contradictory effects on the rate of natural increase. Improved healthcare in the less-developed countries has decreased the infant mortality rate and increased the life expectancy, thus contributing to population growth. Conversely, the same healthcare services are often effective at providing desperately needed contraception and family planning education.
- *Cultural traditions* in many parts of the world encourage high fertility rates by limiting women's employment opportunities outside of the home, by elevating motherhood to a high post and deterring women from doing anything else, or by discouraging the use of contraception.
- *Public policy* can have important implications for population growth in places like China, where the "one couple, one child" program, initiated in 1979, provides economic incentives favoring families who have fewer children and legal penalties for those who have too many.

Countries that have low levels of economic development, education, and gender empowerment, as well as newly reduced infant mortality rates because of improving healthcare, cultural traditions favoring fertility, and little or no public policy limiting population growth tend to have the highest growth rates. These countries, again, are found mainly in sub-Saharan Africa, parts of the Middle East, and Latin America.

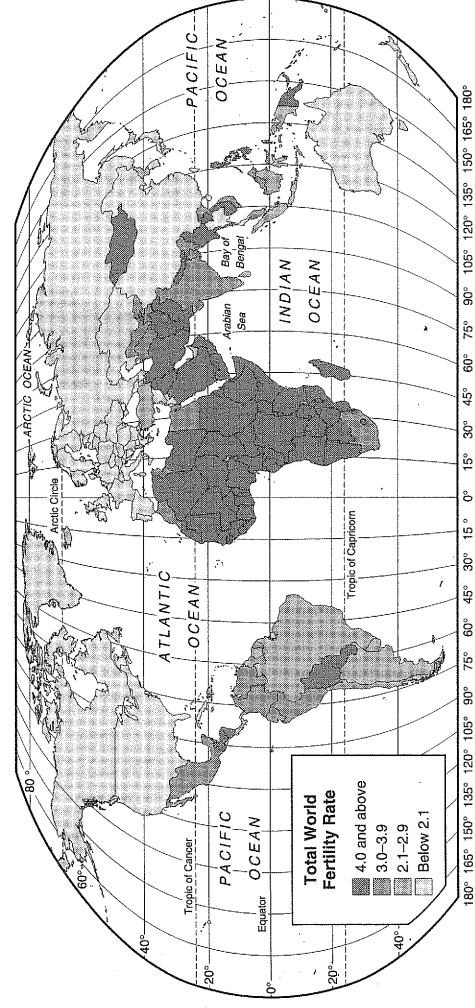


Figure 3.8. World fertility rate by country.

Will a given population continue to grow indefinitely? If not, why, when and at what level will it stabilize? An enormous body of research surrounds these questions, and many careers have been dedicated to projecting and planning for population growth. To predict how much a population will grow, population geographers start with a single, basic formula called the **demographic accounting equation**.



$$\begin{aligned}
 P(t+1) &= P(t) \dots \\
 &+ B(t, t+1) - D(t, t+1) \quad \text{(natural change)} \\
 &+ I(t, t+1) - E(t, t+1) \quad \text{(net migration)}
 \end{aligned}$$

Where

$P$  = population

$B$  = births

$D$  = deaths

$I$  = immigration

$E$  = emigration

$t$  = time now

$t + 1$  = some time in the future

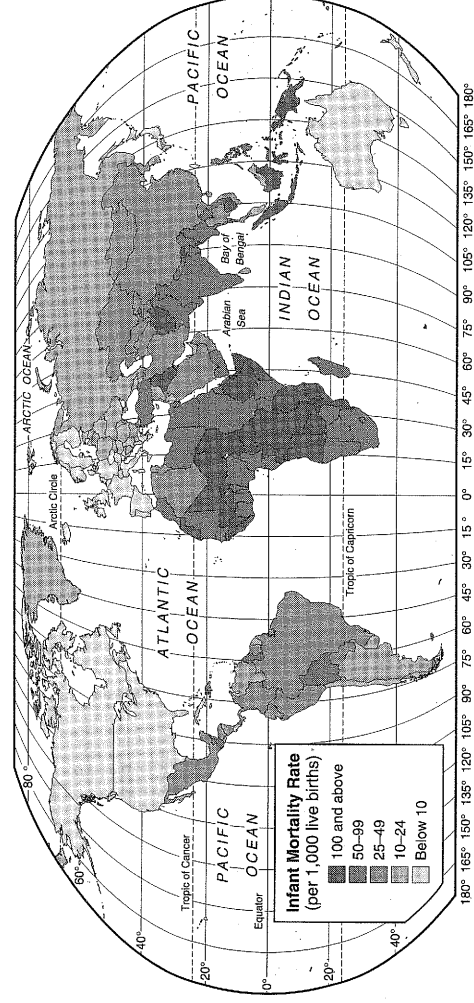


Figure 3.9. Infant mortality rate by country.

The demographic accounting equation says that if you want to predict the population at some time in the future, you need to start with the population now, add the amount of births you expect between now and then, subtract the number of deaths, add immigration, and subtract emigration. The part of the equation regarding births and deaths is the natural increase rate and is, in large part, the subject of this chapter. The part of the equation that computes net migration is covered in the next section. For now, just remember that immigration refers to people moving into some place and emigration refers to people moving out of some place. In the demographic accounting equation, you add people coming in and subtract people leaving.

The demographic accounting equation offers what, at first, appears to be a very simple way of predicting future population. Unfortunately, as we have already seen, many factors affect the parameters that go into the equation, and small differences in these basic inputs can radically change the final answer. You now know that parameters, such as the CBR and CDR, vary geographically from place to place, but to make things even more complicated, these variables also change over time. Furthermore, as we will now discuss, another critically important component of the equation is the movement of human populations between and within countries, or migration, which also varies dramatically over both space and time.

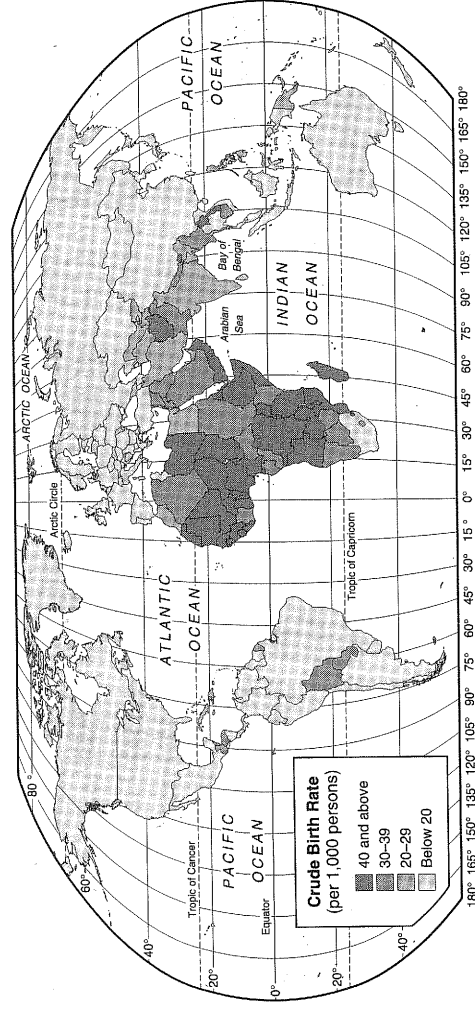


Figure 3.10. Crude birth rate by country.

## HUMAN MIGRATION

Migration is defined as a long-term move of a person from one political jurisdiction to another. Migration can include a move to a neighboring city or a move to another country on a different continent, though each of these has very different implications in terms of local governance, social systems, and planning. People who leave their homelands to live in another country are said to **emigrate**, while people who move into a country **immigrate**. Immigrants from the less-developed world form an increasingly large portion of the populations of many more-developed countries. The difference between immigration and emigration is considered in the demographic accounting equation. As was already mentioned, the accuracy of this equation tends to be somewhat compromised as population rates change over time. With increasing immigration from developing countries into developed countries, it becomes harder to predict future population growth.

Several factors cause people to migrate. The following list outlines some of the main reasons why people might leave homelands for new places.

- *Political issues*, such as armed conflict and the policies of oppressive regimes, have been important historical forces leading to migration. The pilgrims, who sailed on the *Mayflower* to America, fled oppressive governments that had imposed limitations on their religious freedom in Europe. Later, as the United States expanded westward toward the Pacific Ocean, Americans forcibly removed thousands of Native Americans from the lands that their ancestors had inhabited for millennia, relocating them to far-off reservations. Both of these migrations occurred largely in response to political forces.
- *Economic factors* that may lead to migration include job opportunities, economic cycles of growth and recession, and cost of living. Around the beginning of the 20th century, millions of European immigrants arrived in east coast cities,

### TEST TIP

The 2005 AP Human Geography exam included a free-response question that asked students to explain patterns of immigration to the United States between 1900 and 2000, based on a graph depicting immigration over time. How would you answer such a question?

such as New York and Boston, searching for economic opportunities not available in their homelands. During the last 40 years, thousands of older Americans—many of them descendants of that earlier wave of migration—have moved out of the northeastern states seeking inexpensive retirement living in places like Arizona, North Carolina, and Florida. And in the mid-1990s thousands of young professionals moved to the San Francisco area to take advantage of high-paying jobs in the computer industry. When the dot-com bubble burst, many of those same people left the crowded and overpriced Bay Area. In addition, many countries are currently experiencing large rural to urban migrations as corporate farming and increased technology have reduced the number of agricultural laborers needed in rural areas. Many of these former farm workers have migrated to cities in hope of finding new economic opportunities.

- *Environmental issues* can be an important cause of migration in both the less-developed and the more-developed world. For example, in African countries such as Ethiopia, Sudan, and Kenya, many nomadic herders have been forced to breach the boundaries of their former rangelands, searching for more fertile areas that have not been adversely impacted by drought or overgrazing. In the United States, regions such as the Sierra Nevada range in California have experienced dramatic population growth as people living in the state's crowded coastal cities have sought cleaner air, cheaper houses, less traffic, and a perceived higher quality of life in the mountains. The irony is that, as urbanites leave places like Los Angeles and San Francisco in favor of smaller towns and rural areas, they frequently bring big city problems—like crime, pollution, traffic, and high costs of living—with them.
- *Cultural issues* can also cause people to move to places where they feel more at home or where they are able to take advantage of certain institutions. For example, after World War II, many Jews from Europe, the Americas, and elsewhere relocated to the newly formed state of Israel. Israel was the ancestral hearth of Jewish culture and religion, and many Jews feel a strong sense of attachment to it. Israel also served as a place where the Jewish people could regroup in safety, reestablish social ties, and create a sense of political unity after the tragedy of the Holocaust.

- *Transportation routes* can enable and entice people to migrate to new areas. Throughout history, improved transportation technology and improved routes between places have allowed many people to move within countries and across borders. During the 17th and 18th centuries, better ships and more reliable navigation systems made safe travel across the Atlantic Ocean to the Americas a real possibility for many aspiring European immigrants. Similarly, during the 19th century, new stagecoach routes enabled many white settlers to move westward across the American Great Plains and Rocky Mountains to California and Oregon. Finally, new roads into the Amazon constructed by the Brazilian government during the second half of the 20th century, encouraged thousands of people to leave Brazil's densely populated southeastern coast for a life of farming the country's largely unsettled interior.

#### TEST TIP

In 2003 the APHG exam included a free-response question that asked students to consider why, over the past 150 years, Europe has gone from a source to a destination for migration. Can you account for this transition?

People who leave their homes because they are forced out, but not because they are being officially relocated or enslaved, are said to be refugees. The 1951 Convention Relating to the Status of Refugees defined a refugee as someone who, “owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership in a particular social group, or political opinion, is outside the country of his nationality, and is unable to or, owing to such fear, is unwilling to avail himself of the protection of that country.” According to the United Nations High Commissioner for Refugees, the global refugee population, as of 2002, was over 21 million people. In recent years, Asia and Africa together have accounted for more than two-thirds of those people, with countries like Pakistan, Afghanistan, Sri Lanka, Colombia, Angola, and the Democratic Republic of the Congo heading up the list.

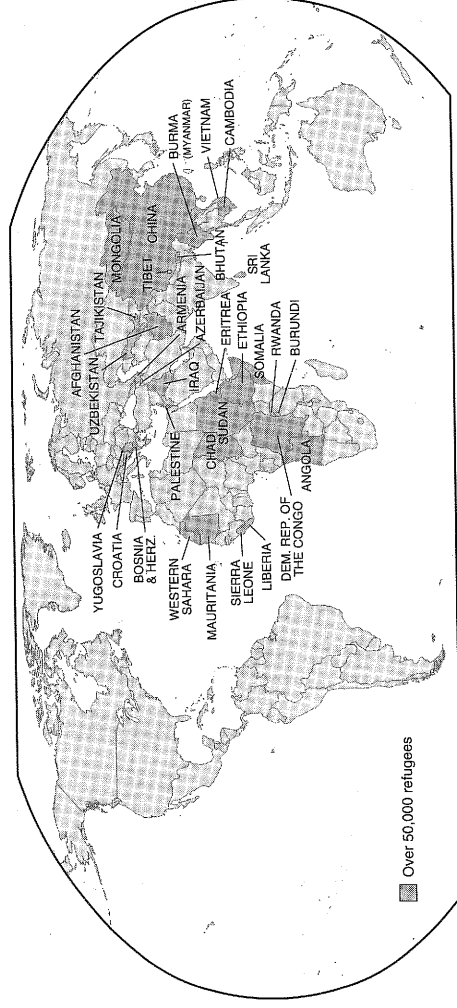


Figure 3.14. All the countries that are significant sources of refugees are located in Africa and southern Asia.

Within the United States, **internal migration** patterns have had a tremendous impact on the ethnic composition of large urban areas and on the relative economic dominance of various cities and regions. For example, beginning in the early 20th century, large numbers of African-Americans moved from the rural South to large cities in the Northeast and Midwest to join the growing industrial workforces located in places like Chicago, Detroit, and New York. For African-Americans, the South had offered racial oppression and little economic opportunity, whereas the North promised a new start and a better way of life. The social effects of this particular migration event are discussed further in Chapter 8. It is also important to remember that in today's increasingly mobile society, people often make many short-term moves for professional or personal reasons.

In the 1960s and 1970s, another pattern emerged, as large numbers of white, middle-class Americans moved from older northeastern and midwestern cities to the South and to the West Coast. At this time, the northern industrial states, such as Ohio, Michigan, and Pennsylvania, were becoming known as the **Rust Belt**. These states, which had previously been industrial powerhouses with vibrant economies,

#### TEST TIP

A free-response question on the 2008 APHG exam explored internal migration in the United States by county. Can you explain why some regions of the United States have experienced net in-migration while others have experienced net out-migration?

were now losing much of their economic base to other parts of the country and the world. Factories were closing down and people were losing their jobs. For would-be migrants, the South offered job opportunities in new high-tech industries, such as software development and aerospace engineering, a pleasant climate, and a relatively affordable cost of living. As a result, during the mid-20th century, the South ceased to be known as the **Cotton Belt**, with its connotations of agrarian poverty and backwardness, and instead became the new land of opportunity—the **Sun Belt**.

Today's Sun Belt includes the "New South" states of Florida, Georgia, Tennessee, and North Carolina, and areas of the Southwest, including portions of Texas, Arizona, Nevada, and Southern California. Cities like Houston, Los Angeles, and San Diego were among the first to experience the rapid population growth associated with the development of the Sun Belt, but beginning in the 1960s, growth also spread rapidly to places like Phoenix, Las Vegas, Dallas, Miami, Tampa, Austin, and Nashville. Some parts of the South and West, such as Louisiana, Mississippi, Alabama, and New Mexico have yet to benefit significantly from the Sun Belt phenomenon. However, the economy, culture, and landscape of much of the southern and western United States have been dramatically transformed.

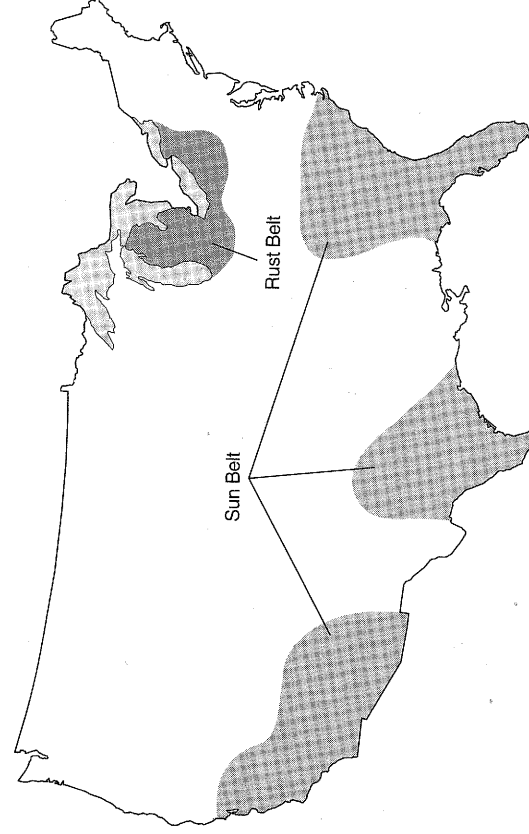


Figure 3.15. The Rust Belt of the Great Lakes region experienced economic woes during the 1970s and 1980s. Many migrants left the upper Midwest for a brighter future in the Sun Belt.

Internal migration patterns have also radically altered the balance of political and economic power. California, Texas, and Florida are now three of the four most populous states in the country (New York is the other). These states, all three of which are at least partly located in the Sun Belt, carry a disproportionate number of electoral votes, have large congressional delegations, and are dominant in many economic sectors, such as technology, energy production, and agriculture. One interesting side note is that the centroid, or geographic center of the U.S. population, is now much farther west and south than it was during the early part of the 20th century, indicating an overall change in the geographic distribution of the U.S. population.

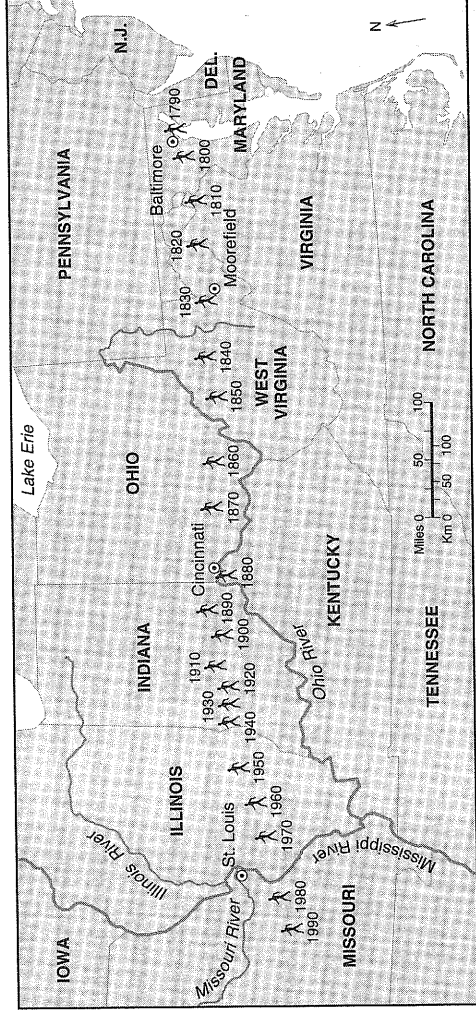


Figure 3.16. The centroid, or geographic center, of the U.S. population has moved progressively west during the past 200 years.

On a smaller geographic scale, suburbanization is one of the most important geographic phenomena affecting the cultural landscape of the United States in the last century. Suburbanization involves migration from the inner city to outlying neighborhoods near the perimeters of urban areas. Suburbanization, which will be covered more extensively in Chapter 8, is partly a response to increasing wealth among the middle classes, partly a response to the freedom created by cars and the interstate highway system, and partly a function of the changing social dynamics and ethnic composition of older American cities. Since the mid-1940s millions of Americans have moved to suburbs, where communities tend to be more ethnically homogeneous and more oriented around the automobile as a form of transportation. A single individual or family's move from the city to the suburb is relatively insignificant, but the process of suburbanization has dramatically affected the social and ecological dynamics of almost every urban area in the United States.

## POPULATION STRUCTURE AND COMPOSITION

Now that the mechanisms controlling and describing populations within certain areas have been discussed, it is important to spend some time focusing on how geographers model population growth, as well as on the various implications population growth may have on the earth's ability to sustain itself. Several models have been developed to explain changes in population over time and to relate various social, economic, and environmental factors to population growth. The economist and demographer Thomas Malthus, in his *Essay on the Principle of Population*, published in 1798, developed the most famous of these models. Malthus based his argument on two claims: (1) people need food to survive, and (2) people have a natural desire to reproduce. He also noted that food production increases arithmetically but population increases geometrically. What he meant by this was that food production grows by the *addition* of more acreage into cultivation, whereas population grows by the *multiplication* of human beings. Malthus' geometric growth is now commonly referred to as **exponential growth**. Based in this premise, Malthus argued that human population growth would eventually outpace people's ability to produce food, leading to widespread

starvation and disease, what he called “negative checks” on the population. Malthus’ theory has been revisited over the decades by many prominent scholars, most recently in 1968 by the neo-Malthusian Stanford ecologist Paul Ehrlich. In *The Population Bomb*, Ehrlich made a similar argument about the ability of the earth to sustainably provide resources for an exponentially growing population.

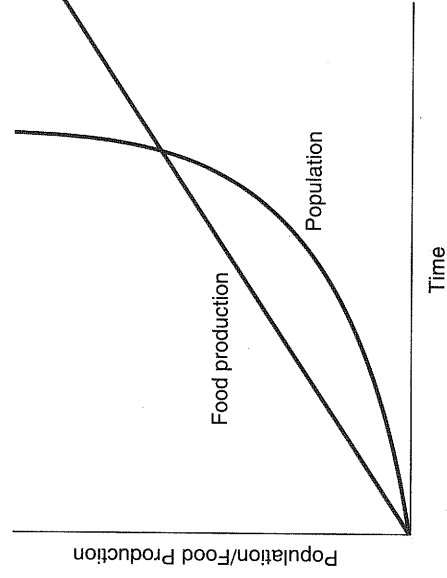


Figure 3.17. Thomas Malthus predicted the population, which grows geometrically (exponentially), would eventually outpace food production, which grows arithmetically (linearly).

There are several problems with the Malthusian perspective. First, although Malthus foresaw the development of new agricultural technologies, he did not fully account for the ability of people to increase food production dramatically with these technologies. Second, Malthus assumed that humans have no control over their reproductive behavior. He did not foresee that population growth would slow down over time because of effective contraception, the changing roles of women in society, and individual people’s reproductive decisions. Finally, he did not recognize that famine is usually related not to a lack of food, but to the unequal distribution of food. For example, famine struck various parts of Africa repeatedly throughout the 20th century, despite the fact that an abundance of food existed in other parts of the world. These problems have caused many people to discount Malthusian theory altogether.

However, Malthus’ theories have helped to bring attention to issues of sustainability and have informed the work of numerous other influential scholars, such as the great ecologist and evolutionary theorist Charles Darwin.

The **demographic transition model**, which explains changes in the natural increase rate as a function of economic development, provides another interpretation of population growth. According to this model, at low levels of economic development, birth and death rates will both be high, but births will significantly outpace deaths. As a country progresses through several stages of economic development, birth rates and death rates will both decrease, ultimately flattening out at some low level. The total population, which increased markedly during the early and middle stages, eventually plateaus as birth rates and death rates converge. This

#### TEST TIP

The subject of Malthusian population growth provides many possibilities for essay questions. You should be sure to familiarize yourself with arguments for and against Malthus’ theory, and be ready to write an effective essay.



model seems to describe accurately the paths taken by some countries that are already highly developed. It also effectively characterizes various states of population change and development currently existing in many countries across the world.

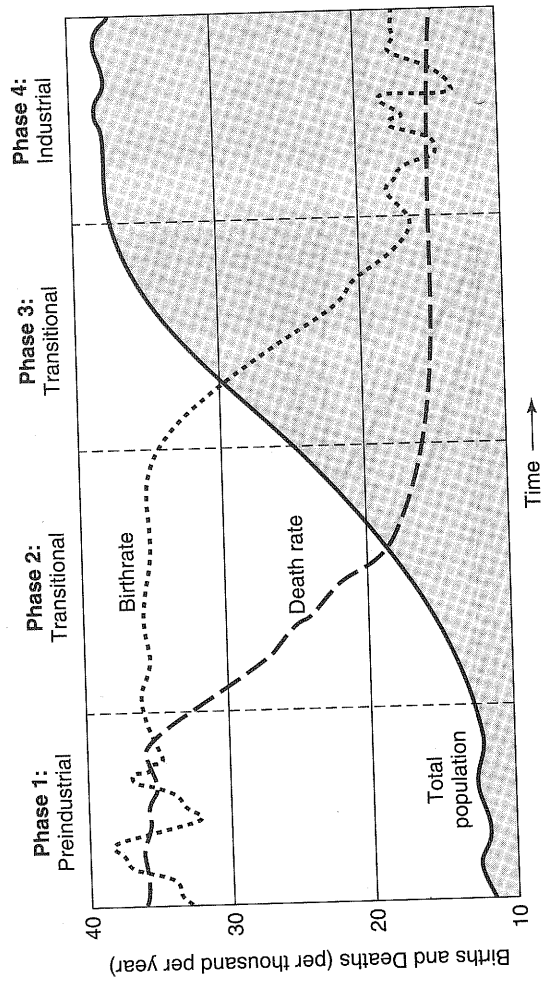


Figure 3.18. The demographic transition model.

Whether this model is universally applicable is another matter. Many geographers have argued that the demographic transition model is too simplistic in its portrayal of the relationship between economic development and population and that factors such as culture, religion, geopolitics, migration, and the structure of the global economic system itself may prevent many of today's less developed countries from ever taking the path described. Moreover, geographers have also pointed out regional variations in demographic transitions, such as those demonstrated in different countries throughout Western Europe. Thus, the relationship between national economics and population is complicated by other factors, such as the structure of the world economic system and cultural constraints.

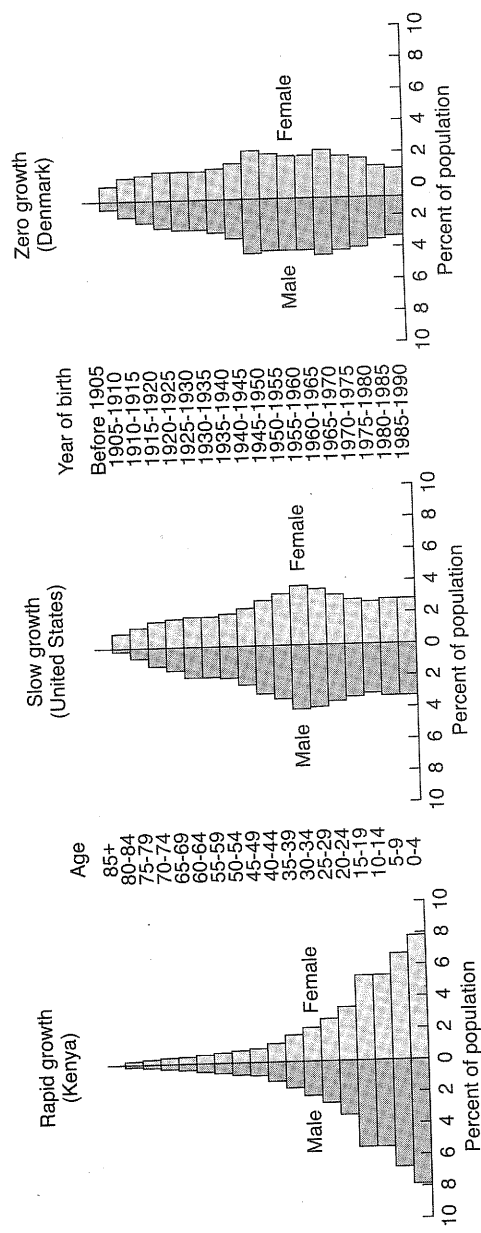


Figure 3.19. Population pyramids for three different countries: Kenya, the United States, and Denmark. Compare Kenya's rapidly growing, youthful population to Denmark's older, stable population.

Another way of looking at population growth is by analyzing a country's **age-sex distribution** through the use of **population pyramids**. A population pyramid shows how a country's populace is distributed between males and females of various ages. Population pyramids are useful because they explain much about the recent history of a country's population and because they present a convenient, graphical basis on which to make predictions about impending population change. A population pyramid with a triangular shape and a wide base depicts a country that has a high proportion of young people and is growing rapidly. A population pyramid with a more rectangular shape depicts a population with a relatively even number of young, middle-aged, and older people and is typical of highly developed countries with low growth rates.

The **baby boom** generation is an example of a population **cohort** that has had a tremendous influence on American culture, politics, and economics. A cohort is simply a group of people that all have something in common and are usually grouped together for statistical purposes. The baby boom generation includes all Americans born between 1946 and 1964. After World War II, which ended in 1945, the United States entered a period of relative peace and economic prosperity. Jobs were plentiful, and government aid programs, such as the G.I. Bill, helped many veterans reestablish themselves in the postwar economy. War veterans were able to begin a new life at home in the States with an education, a home, and a secure job. These conditions, combined with the relatively conservative social environment of the day, encouraged high rates of marriage and fertility. Although the total fertility rate had already peaked before 1950, the baby boom still produced the largest, best-educated, and most financially secure generation in all of American history.

The generation that followed the baby boom is another story. People born between the years of 1965 and 1980 are sometimes referred to as **Generation X**. The term "Generation X" was coined by the off-beat author and artist Douglas Coupland to describe a generation without the overwhelming numbers and unifying identity enjoyed by the baby boomers. By the mid-1970s the American psyche had been severely damaged by the tragedy of the Vietnam War and the debacle of the Watergate affair. In addition, the women of the baby boom generation, many of whom reached mothering age during this period, were seeking more education, pursuing more demanding careers, waiting longer to marry, and having fewer children than the generation that had come before them. As a result, the natural increase rate declined significantly during the 1960s and 1970s, in what some demographers have called a **baby bust**.

The baby boomers are currently leaving Generation X with another interesting problem. As they get older, they will place unprecedented pressure on healthcare, social security, and other services that will cost billions of dollars. As a result, the **dependency ratio**, which refers to the percentage of people in a population who are either too old or too young to work and, thus, must be supported by others, will increase dramatically over the next two decades. It remains to be seen what Generation Xers will be able to do with the complex world they have inherited, as they come of age and emerge out of the shadow of the baby boom.

#### TEST TIP

Some countries with declining indigenous populations, such as France, have initiated pro-natalist policies that encourage births. Others with high and increasing populations have enacted anti-natalist policies that discourage births. China's "one child" policy provides an example of the latter.

## POPULATION AND SUSTAINABILITY

To truly appreciate the impact of population on people and the landscape, geographers must also consider **population density**. Population, or **arithmetic density**, defined as the number of people living in a given unit area, varies dramatically from place to place. It tends to be the greatest in large urban areas and least in regions with harsh environments, such as deserts and polar regions. **Physiologic density** compares human population to the area of cropland in less-developed countries, where production is geared mainly toward subsistence agriculture. On a global scale, the greatest population densities currently occur in eastern China, Japan, Southeast Asia, the Indian subcontinent, Western Europe, and the northeastern United States. The countries with the highest population densities on earth are generally considered to be Bangladesh and the Netherlands. Within the United States, the highest population densities occur in crowded cities such as New York and San Francisco.

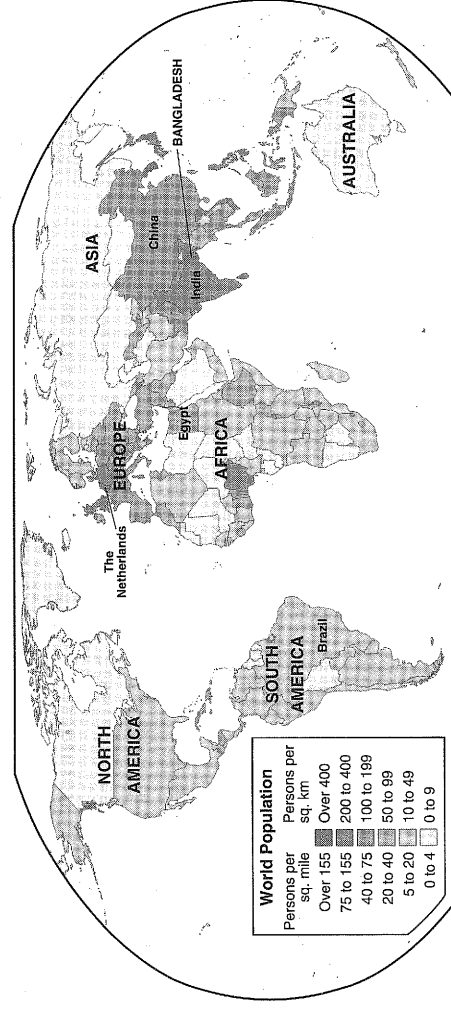


Figure 3.20. Population density by country.

In many of the world's most populous regions, population density has become so great that some people have raised the thorny issue of **carrying capacity**. In human geography, as in ecology, carrying capacity refers to the number of individuals a given area is capable of maintaining. Carrying capacity is a tricky subject because most people do not live exclusively off products produced locally. Average consumption of resources varies dramatically from place to place, and social and technological change constantly alters people's resource demands. These problems make carrying capacity a moving target that is impossible to ever really compute. One way of thinking about carrying capacity is to use the concept of the limiting factor. This concept, which was originally used to describe the way in which plants use resources in the environment, says that the only truly limiting resource is the one that is in the scarcest supply. Las Vegas, for example, may have an ample amount of electrical power and inexpensive land, but in a place that receives just a few inches of rain a year, water should guide planning and limit growth. By this rule, the population of Las Vegas, like so many other cities in arid and semiarid regions, has probably already surpassed its sustainable carrying capacity. The result of artificially surpassing such natural limits is almost always ecological degradation, loss of arable land,

and harm to native ecosystems, not to mention the profound social and psychological impacts of living in an overcrowded, overused landscape. Yet, for the past 20 years, Las Vegas has been the fastest growing city in the United States.

With so many potential problems resulting from population growth, many countries and some international organizations have begun to think about and address **overpopulation**. Overpopulation is not easy to define because many of today's most pressing international problems related to overpopulation also involve a host of other issues, from overconsumption of resources, to the inefficient allocation of goods and services, to unsustainable land use practices. Generally, overpopulation in a particular area implies a breach of that area's carrying capacity. A given geographical area has the ability to sustainably support a specific population. As that population increases, the region may employ new agricultural techniques or cultivate more land to support more people. At some point, the area is no longer able to return enough goods to sustain a certain population; at this point, the area has extended beyond its carrying capacity. In addition, the mechanisms used to try to increase carrying capacity often have environmental and social repercussions. Many activists in the more-developed countries, who believe that overpopulation is the root cause of the world's social and environmental problems, support policies that they believe will lead to **zero population growth**. However, most leaders from the less-developed countries tend to lay blame on people in the wealthiest countries, who consume a disproportionate share of the earth's natural resources. The following statement—submitted by the Indian delegation to the United Nations International Conference on Population and Development, held in Cairo, Egypt, in 1994—regarding the development of international population policy is representative of that sentiment.

The Indian delegation agrees . . . that the draft document focuses disproportionately on the linkages of population and environment. There is little mention of the pattern of consumption in the industrialized nations which cannot long be supported without serious damage to the biosphere. The industrialized nations with approximately 20% of the world's people are currently responsible for three-quarters of the world's energy use, two-thirds of all greenhouse gases and 90 percent of the chlorofluorocarbons. Population growth alone is not responsible for environmental degradation. The inter-linkage between population, poverty, environment and sustainable development is complex.

As the world population swells and as urban areas and developing countries experience increasing population density, it is increasingly apparent that certain policy initiatives will be necessary to combat future problems stemming from overpopulation. Some population policies seek to limit population growth in particular countries either through fertility control or by imposing immigration restrictions. In both cases, the type of policy implemented is largely determined by the politics of public perception and by prevailing ideologies. Many seemingly unsolvable questions surround the design and implementation of population policy. Is it possible to humanely limit an individual's right to reproduce? How should a government determine who will be permitted to enter? Furthermore, when designing an appropriate policy, countries must determine the number of

#### TEST TIP

The relative importance of population versus consumption in environmental problems provides another possible essay question. You should be able to describe the various arguments, give appropriate examples, and offer a critical appraisal.

people they think they can sustain. Of course, this involves even trickier questions regarding an appropriate standard of living and people's level of consumption.

The world's two most populated countries, India and China, both have implemented policies to curb population growth within their borders. The policies implemented in each country reflect differing cultures and political situations. In communist-controlled China, families are "encouraged" to have only one child by rewards given to families who follow this dictate and punishments given to those who do not. In the more democratic India, individuals are also encouraged to limit the number of children they bear, but instead the means of encouragement come through education and improved access to family planning.

The numerous questions surrounding population policy illustrate that it is an issue that is continually fraught with controversy. Some leaders see international population policy as infringing upon the fundamental human right to reproduce. For others, fertility has special cultural or religious value, and any attempts to limit it are seen as cultural persecution. The Catholic Church officially believes that practices of birth control and abortion are sinful, thus implementing any form of fertility control can be difficult in predominantly Catholic countries. However, even in predominantly Catholic countries, where there is a high standard of living and plentiful opportunities for women, growth is always low. Italy, which has an extremely low growth rate, is a case in point.

Immigration policy is also frequently contentious. Many people are concerned that policies specifically limiting the number of immigrants into a particular area are inhumane and may be the product of racist desires to limit the population of particular types of people. Within a given state, it is hard to predict how citizens may react to seeing new immigrants move into their neighborhood. Whether or not you believe that the Indian delegation is correct in its assessment of the population debate, it is obvious that there are no easy solutions, and that the Indians do make an excellent point when they say that the "inter-linkage between population, poverty, environment and sustainable development is complex." They have firsthand experience as a country with over a billion people.

As you have probably surmised, population geography is a wide-ranging and multifaceted field, and one that keeps geographers extremely busy! Geographers know that it is critical to understand population dynamics and growth patterns throughout the world, in order both to provide for current populations and to plan for the future. At the same time, issues of mobility, healthcare, education, policy, and economics render making steadfast predictions extremely difficult. With these challenges in mind, geographers work to improve their models, to test their theories, and to better understand human populations throughout the world.

## KEY TERMS

**Age-sex distribution A** model used in population geography that describes the ages and number of males and females within a given population; also called a population pyramid.

**Arithmetic Density** The number of people living in a given unit area.

**Baby boom** A cohort of individuals born in the United States between 1946 and 1964, which was just after World War II in a time of relative peace and prosperity. These conditions allowed for better education and job opportunities, encouraging high rates of both marriage and fertility.

**Baby bust** Period of time during the 1960s and 1970s when fertility rates in the United States dropped as large numbers of women from the baby boom generation sought higher levels of education and more competitive jobs, causing them to marry later in life. As such, the fertility rate dropped considerably, in contrast to the baby boom, in which fertility rates were quite high.

**Carrying capacity** The largest number of people that the environment of a particular area can sustainably support.

**Census Tract** Small county subdivisions, usually containing between 2,500 and 8,000 persons, delineated by the US Census Bureau as areas of relatively uniform population characteristics, economic status, and living conditions.

**Chain migration** The migration event in which individuals follow the migratory path of preceding friends or family members to an existing community.

**Child Mortality Rate** Number of deaths per thousand children within the first five years of life.

**Cohort** A population group unified by a specific common characteristic, such as age, and subsequently treated as a statistical unit.

**Cotton Belt** The term by which the American South used to be known, as cotton historically dominated the agricultural economy of the region. The same area is now known as the New South or Sun Belt because people have migrated here from older cities in the industrial north for a better climate and new job opportunities.

**Crude birth rate** The number of live births per year per 1,000 people.

**Crude death rate** The number of deaths per year per 1,000 people.

**Demographic accounting equation** An equation that summarizes the amount of growth or decline in a population within a country during a particular time period taking into account both natural increase and net migration.

**Demographic transition model** A sequence of demographic changes in which a country moves from high birth and death rates to low birth and death rates through time.

**Demography** The study of human populations, including their temporal and spatial dynamics.

**Dependency ratio** The ratio of the number of people who are either too old or young to provide for themselves to the number of people who must support them through their own labor. This is usually expressed in the form  $n:100$ , where  $n$  equals the number of dependents.

**Doubling time** Time period required for a population experiencing exponential growth to double in size completely.

**Emigration** The process of moving out of a particular country, usually the individual person's country of origin.

**Exponential growth** Growth that occurs when a fixed percentage of new people is added to a population each year. Exponential growth is compound because the fixed growth rate applies to an ever-increasing population.

**Forced migration** The migration event in which individuals are forced to leave a country against their will.

**Generation X** A term coined by artist and author Douglas Coupland to describe people born in the United States between the years 1965 and 1980. This post-baby-boom generation will have to support the baby boom cohort as they head into their retirement years.

**Geodemography** See population geography.

**Immigration** The process of individuals moving into a new country with the intentions of remaining there.

**Infant mortality rate** The percentage of children who die before their first birthday within a particular area or country.

**Internal migration** The permanent or semipermanent movement of individuals within a particular country.

**Intervening obstacles** Any forces or factors that may limit human migration.

**Involuntary migration** See forced migration.

**Life expectancy** The average age individuals are expected to live, which varies across space, between genders, and even between races.

**Thomas Malthus** Author of *Essay on the Principle of Population* (1798) who claimed that population grows at an exponential rate while food production increases arithmetically, and thereby that, eventually, population growth would outpace food production.

**Maternal mortality rate** Number of deaths per thousand of women giving birth.



**Migration A** long-term move of a person from one political jurisdiction to another.

**Natural increase rate** The difference between the number of births and number of deaths within a particular country.

**Neo-Malthusian Advocacy** of population control programs to ensure enough resources for current and future populations.

**Overpopulation A** value judgment based on the notion that the resources of a particular area are not great enough to support that area's current population.

**Physiologic density A** ratio of human population to the area of cropland, used in less developed countries dominated by subsistence agriculture.

**Population density A** measurement of the number of persons per unit land area.

**Population geography A** division of human geography concerned with spatial variations in distribution, composition, growth, and movements of population.

**Population pyramid A** model used in population geography to show the age and sex distribution of a particular population.

**Pull factors** Attractions that draw migrants to a certain place, such as a pleasant climate and employment or educational opportunities.

**Push factors** Incentives for potential migrants to leave a place, such as a harsh climate, economic recession, or political turmoil.

**Refugees** People who leave their home because they are forced out, but not because they are being officially relocated or enslaved.

**Rust Belt** The northern industrial states of the United States, including Ohio, Michigan, and Pennsylvania, in which heavy industry was once the dominant economic activity. In the 1960s, 1970s, and 1980s, these states lost much of their economic base to economically attractive regions of the United States and to countries where labor was cheaper, leaving old machinery to rust in the moist northern climate.

**Sun Belt** U.S. region, mostly comprised of southeastern and southwestern states, which has grown most dramatically since World War II.

**Total fertility rate** The average number of children born to a woman during her childbearing years.

**Voluntary migration** Movement of an individual who consciously and voluntarily decides to locate to a new area—the opposite of forced migration.

**Zero population growth Proposal** to end population growth through a variety of official and nongovernmental family planning programs.